

12 3. (Once Amended) A method according to claim 1, wherein the epoxy resin comprises a cresol novolac epoxy resin.

4. (Once Amended) A method according to claim 1, wherein the epoxy resin comprises a glycidylamine epoxy resin.

5. (Once Amended) A method according to claim 1, wherein the epoxy resin comprises a bixphenol A epoxy resin.

6. (Once Amended) A method according to claim 1, wherein the phenolic resin comprises a novolac phenolic resin.

7. (Once Amended) A method according to claim 1, wherein the phenolic resin comprises a resol phenolic resin.

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#### REMARKS

Claims 1-12 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to clearly define the identities of the components of the claimed invention. Claims 3-7 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for using the word "type". In addition, claims 1-3, 5-8 and 11-12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,956,131 to Shigeta, *et al.* ("Shigeta") in view of JP 69042781. Finally, claims 4, 9 and 10 stand objected to as being dependent on a rejected base claim, but are identified as being allowable if rewritten to incorporate all the limitations of the base and intervening claims.

The Applicant has reviewed the December 5, 2000 Office Action, and respectfully submits the following remarks in response thereto. The Applicant is grateful for the Examiners' indication that claims 4, 9 and 10 would be allowable if amended to incorporate the limitations of their respective base and intervening claims. The Applicant respectfully declines the invitation to amend claims 4, 9 and 10 at this time, however, in view of his belief that the independent and intervening claims are allowable.

In view of the following remarks, the Applicants respectfully request reconsideration of the pending rejections and allowance of claims 1-12.

**1. The Present Invention Is Patentable Over Shigeta and JP 59042781.**

The Applicant respectfully traverses the § 103(a) rejection of claims 1-3, 5-8 and 11-12 because JP 59042781 does not cure the deficiencies of Shigeta. Accordingly, the § 103(a) rejection cannot stand.

**a. JP 59042781 Does Not Cure the Deficiencies of Shigeta.**

As the Office Action acknowledges, Shigeta does not teach the present invention's "process for mixing both types [of] resins to form a separator." December 5, 2000 Office Action at 3. JP 59042781 does not cure this deficiency.

The abstract of JP 59042781 is cited as teaching "a method for producing a carbon material for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing the material." *Id.* at 3-4. Review of the cited portion of this reference, however, reveals that JP 59042781 in fact teaches only a binder consisting of a "vinyl phenol polymer and a *phenol* resin initial condensation product which has an *epoxy group*." Clearly, such a phenol resin is not an *epoxy resin* nor does the addition of an epoxy group comprise a "process for mixing both types [of] resins to form a separator." JP 59042781 therefore does not teach or suggest the element missing in Shigeta, let alone the mixture of phenolic resin and epoxy resin taught by the present application. The claimed invention uses a phenolic resin having a hydroxyl group and prepares the epoxy resin and the phenolic resin as main components of the raw material of the separator for the fuel cell rather than a phenolic resin having an epoxy group as a main component of the binder. Because Shigeta and JP 59042781, either alone or in combination, fail to teach or suggest the present invention, claims 1-3, 5-8 and 11-12 are patentable over these references.

In view of the foregoing, the Applicant respectfully requests reconsideration and withdrawal of the pending § 103(a) rejections of claims 1-3, 5-8 and 11-12.

**2. The § 112 Indefiniteness Issues Have Been Addressed.**

**a. The Word "Type" Has Been Deleted from Claims 3-7.**

Claims 3-7 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for using the word "type". The claims have been amended by deleting the word "type" to render them definite, in accordance with the Examiner's helpful suggestion. In view of the

above amendments and remarks, the Applicant respectfully requests that this rejection be withdrawn.

**b. Claim 1 Has Been Amended to Clarify That the Epoxy Resin Is Different from the Phenolic Resin.**

Claims 1-12 stand rejected under § 112, second paragraph as being indefinite for failing to clearly define the identities of the components in the mixtures of phenolic resins and epoxy resins in the present invention. The Applicant's Representative spoke with the Examiner on February 23, 2001 to propose the amendment to the parent claim, 1, submitted herewith to show that the epoxy resin "is a distinct and separate component" that differs from the phenolic resin.

Consistent with the well-known nature of epoxy and phenolic resins, the specification at pages 15 and 26 generally identifies suitable resin materials, for example, a "cresol novolac type epoxy resin" and a "novolac type phenolic resin," and later, for the epoxy resin a "glycidylamine type epoxy resin or bisphenol A type epoxy resin" and for the phenolic resin "resol type phenolic resin." Application at 15, 26. Moreover, the specification identifies the nature of the mixture compositions and the chemical reactions therebetween to achieve the desired minimal gas formation, water generation and swelling, and provides guidance as to the quantities of the components required Application at 24-26 (*e.g.*, after describing the chemical reactions and undesired properties of some mixtures, the specification identifies that "[i]n order to effectively suppress generation of vapor during heat-press forming by using the binder containing the phenolic resin and the epoxy resin, the epoxy resin has to contain sufficient amount of epoxy group to be reacted with the hydroxyl group such that the hydroxyl group of the phenolic resin generates no undesirable vapor. For example, when using equal amounts of the epoxy resin having an epoxy equivalent ranging from 100 to 250 g is mixed with the phenolic resin having OH equivalent ranging from 100 to 120 g.").

The Applicant respectfully submits that this amendment is fully supported by the disclosure is more than sufficient to overcome the Examiner's 35 U.S.C. § 112, second paragraph concern. The Applicant further submits that the amended is merely another way of restating the original claim language that makes clear that the terms "epoxy resin" and "phenolic resin" are used to refer to two different materials. In view of the forgoing amendment and remarks, the Applicant respectfully submits that they have met their

obligations under § 112, second paragraph, and request withdrawal of the pending § 112, second paragraph rejections of claims 1-12.

**Conclusion**

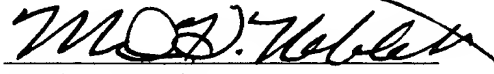
In view of the foregoing amendments and remarks, the Applicant earnestly solicits an early and favorable action on the merits and issuance of a Notice of Allowance for claims 1-12.

The Examiner is invited to contact the undersigned to discuss any matter concerning this application.

Applicants respectfully request a one-month Extension of Time to respond to the Office Action of December 5, 2000. The extended period expires April 5, 2001. The Office is hereby authorized to charge the fee of \$110.00 for a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) and any additional fees under 37 C.F.R. § 1.16 or § 1.17 or credit any overpayment to Deposit Account No. 11-0600.

Respectfully submitted,

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## **MARKED UP VERSION OF AMENDED CLAIMS**

1. (Once Amended) A method of manufacturing a separator for a fuel cell comprising:  
preparing a raw material by mixing a carbon, an epoxy resin and a phenolic resin,  
wherein said phenolic resin is different from said epoxy resin;  
charging the raw material into a predetermined mold; and  
heat press forming the raw material charged into the mold.
3. (Once Amended) A method according to claim 1, wherein the epoxy resin  
comprises a cresol novolac [type] epoxy resin.
4. (Once Amended) A method according to claim 1, wherein the epoxy resin  
comprises a glycidylamine [type] epoxy resin.
5. (Once Amended) A method according to claim 1, wherein the epoxy resin  
comprises a bixphenol A [type] epoxy resin.
6. (Once Amended) A method according to claim 1, wherein the phenolic resin  
comprises a novolac [type] phenolic resin.
7. (Once Amended) A method according to claim 1, wherein the phenolic resin  
comprises a resol [type] phenolic resin.